

REMARKS

Amendment to Title

The title is amended to change the misspelled word “therefor” to “thereof”. No new matter is entered.

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Claims 5 and 31 are objected to because “a detachable canister” is not disclosed in the specification.

Paragraph [0045] of the specification is amended to state “Each of the PSDs is contained in a detachable canister attached to the storage virtualization controller.” No new matter is entered as this limitation was already disclosed in claims 5 and 31 as originally filed. In this way, claims 5 and 31 are supported by the specification. Withdrawal of the objections to claims 5 and 31 is respectfully requested.

Claims 47, 48, 84 and 85 are objected to because applicant does not clearly state what “SES” or “SAF-TE” stands for in the specification.

Paragraph [0100] is amended to include the definitions for the acronyms SAF-TE (Small Computer System Interface Accessed Fault Tolerant Enclosures) and SAF-TE (Small Computer System Interface Enclosure Services). No new matter is entered. In particular, the definitions of these acronyms at the time of original filing were well known to those having skill in the art. For example, refer to the following online acronym lookup service:

<http://acronyms.thefreedictionary.com/SAFTE>, and

<http://acronyms.thefreedictionary.com/SES>.

Withdrawal of the objections to claims 47, 48, 84 and 85 is respectfully requested.

Claims 18 and 39 are objected to because applicant does not clearly state what “ISCSI” stands for in the specification.

Paragraph [0050] of the specification is amended to include the definition for the

acronym iSCSI (Internet Small Computer System Interface). No new matter is entered. In particular, the definition of this acronym at the time of original filing was well known to those having skill in the art. Please refer to the following online acronym lookup service:

<http://acronyms.thefreedictionary.com/ISCSI>.

5 Withdrawal of the objections to claims 18 and 39 is respectfully requested.

Claims 11 and 25 are rejected under 35 USC 112, second paragraph, as being indefinite because the limitation “... interconnect controllers” (line 1) renders this claim as vague and indefinite. Claim 11 is dependent on claim 9, which discloses one controller so claim 10 11 can’t refer to two controllers. The same applies to claim 25.

15 Applicant has amended claims 11 and 25 to include the limitation, “wherein said at least one IO device interconnect controller comprises a plurality of IO device interconnect controllers”. No new matter is entered. In particular, claims 11 and 25 previously claimed different controllers (i.e., more than one). Further information regarding the reasons for canceling claims 9 and 23 will be described below.

Concerning the 35 USC 112 rejection of claims 11 and 25, applicant respectfully asserts that currently amended claims 11 and 25 should not be found rejected as being indefinite due to referring to two controllers because currently amended claim 1 (limitations taken from original claim 9) discloses “at least one IO device interconnect controller”. Therefore, the 20 language of claim 1 clearly does not preclude having more than one IO device interconnect controller. Hence, currently amended claim 11 further comprising a plurality of IO device interconnect controllers and being dependent upon claim 1 should be deemed as further limiting the scope of invention claimed in claim 1. In other words, claim 11 should be found to be a proper dependent claim. A similar argument also applies to claim 25.

25 For the above-described reason, applicant believes that currently amended claims 11 and 25 are definite for pointing out and distinctly claiming the subject matter which the applicant regards as the invention. Withdrawal of the 35 USC 112 rejections of claims 11 and 25 is respectfully requested.

Claims 1-16, 20-37, 41-46, 50, 78-83, 86-88, and 90-94, are rejected under 35 USC 102e as being anticipated by Bicknell et al. (US pub. 2003/0193776)

As mentioned above, claim 1 is amended to include all the limitations of dependent claim 5. Claim 9 is correspondingly cancelled and claims 10, 11, 14, 15, 16, 17, 18, 19, and 20, previously dependent upon claim 9, are amended to now be dependent upon currently amended claim 1. Similarly, independent claim 21 is amended to include all the limitations of dependent claim 23. Claim 23 is correspondingly cancelled and claims 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, and 42, previously dependent upon claim 23, are 10 amended to now be dependent upon currently amended claim 21. Additionally, independent claims 78 and 90 are amended to include limitations equivalent to those found in original claim 9. No new matter is entered.

Concerning the patentability of independent claims 1, 21, 78 and 90, applicant asserts that claims 1, 21, 78 and 90 should not be found rejected for being anticipated by Bicknell et al. 15 because Bicknell et al. do not disclose all features of the present invention as claimed in claims 1, 21, 78, and 90. In particular, applicant points out the following differences:

1. Claim 1 of the present invention claims **“an external storage virtualization controller (SVC)”**, which is a storage controller that performs “storage 20 virtualization” and is of an “external” type.

The meaning of “Virtualization” can be found in the specification - “Storage virtualization is a technology that has been used to virtualize physical storage by combining sections of physical storage devices (PSDs) into logical storage entities, herein referred to as logical media units (LMUs), that are made accessible to a host 25 system. This technology has been used primarily in redundant arrays of independent disks (RAID) storage virtualization, which combines smaller physical storage devices into larger, fault tolerant, higher performance logical media units via RAID technology.” “A Storage virtualization Controller, abbreviated SVC, is a device the

primary purpose of which is to map combinations of sections of physical storage media to logical media units visible to a host system...." "The primary function of a storage virtualization controller, abbreviated as SVC, is to manage, combine, and manipulate physical storage devices in such a way as to present them as a set of 5 logical media units to the host. Each LMU is presented to the host as if it were a directly-connected physical storage device (PSD) of which the LMU is supposed to be the logical equivalent...."

10 Bicknell disclosed a storage controller, but did not disclose nor teach a storage controller that performs "storage virtualization," namely, a "storage virtualization controller."

15 The meaning of a storage controller of an "external" type can be found in the specification - "An External (sometimes referred to as "Stand-alone") Storage Virtualization Controller is a Storage Virtualization Controller that connects to the host system via an IO interface and that is capable of supporting connection to devices that reside external to the host system...." Therefore, the storage virtualization controller is connected to the host entity through an IO interface. Usually, using an IO interface/protocol may have a longer signal transmission distance.

20 Bicknell disclosed a storage controller, but did not disclose nor suggest a storage controller of an "external" type, namely, an "external storage controller", as claimed in the present invention.

Therefore, Bicknell neither discloses nor suggests the "external storage virtualization controller" claimed in claim 1 of the present invention.

2. Claim 1 of the present invention claims an external storage virtualization controller (SVC), which comprises "a central processing circuitry (CPC) for performing IO operation in response to said IO requests of said host entity; at least one IO device interconnect controller coupled to said CPC; at least one host-side IO device interconnect port provided in a said at least one IO device

interconnect for coupling to said host entity; and at least one device-side IO device interconnect port provided in a said at least one IO device interconnect for coupling to a said at least one PSD.”

5 Bicknell neither discloses nor suggests the “external storage virtualization controller comprising a central processing circuitry (CPC) for performing IO operation in response to said IO requests of said host entity” as claimed in the present invention.

10 Bicknell disclosed a disc storage subsystem 100 comprising a pair controllers 108, an intermediate electronic component 110, a midplane card 112, and a plurality of disc drives 106 (See paragraph [0016]). In operation, a host computer may access data stored in the disc drives 106 through controllers 108 and the intermediate electronic components 110. Each intermediate electronic component 110 determines which controller 108 is provided data access to a particular disc drive 106 by opening and closing data communication paths between the disc drive 106 and each of the controllers 108. In the event that one of the controllers 108 fails, data stored in the disc drives 106 can still be accessed by the host computer through the remaining active controller 108 (See paragraph [0017]). Each intermediate electronic component 110 includes multiplexing electronics (MUX) 208 that operates to selectively open and close data communication paths linking data interface 144 of a disc drive 106 to each of the controllers 108 (See paragraph [0027]). MUX 208 includes a micro-computer 222 that monitors the control signals and controls the opening and closing of data paths 212 and 213 in response thereto. In accordance with another embodiment of the invention, micro-computer 222 of MUX 208 produces a status signal output 224 that is directed to each of the controllers 108 to inform controllers 108 whether the first data path 212 or second data path 213 is open (See fig. 8 and paragraph [0028]).

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In short, Bicknell disclosed that a pair storage controllers 108 both may be connected to the same host, and that both controllers 108 are connected to the same

disc drive 106 through a MUX 108, in which the first and second controllers 108.1 and 108.2 are connected to the MUX 108 through a first path 212 and a second 213, and then the MUX 108 is connected to the disc drive 106. A micro-computer 222 is provided in the MUX 108 to monitor the control signals and control the opening and closing of data paths 212 and 213. The micro-computer 222 is not provided for performing IO operation in response to the IO requests of the host entity. Instead, the micro-computer 222 is provided for selectively opening or closing the paths 212 and 213. From aforesaid viewpoint, because the micro-computer 222 is used to selectively open or close the paths 212 and 213 in the MUX 108, the micro-computer 222 has to be provided in the MUX 108, and thus cannot correspond to the central processing circuitry (CPC) of the external storage virtualization controller (SVC) of the present invention. In addition, the micro-computer 222 is not provided in the controller 108. Moreover, if the micro-computer 222 were to be installed in one of the controllers 108.1 or 108.2, then the micro-computer would not be able to monitor the control signals and controls the opening and closing of data paths 212 and 213.

Therefore, applicant respectfully asserts that Bicknell neither discloses nor suggests “the central processing circuitry (CPC) for performing IO operation in response to said IO requests of said host entity” included in the external storage virtualization controller.

Additionally, Bicknell disclosed an interface 200 and ports (fig.8) for connecting to the MUX 208 and then to disc drive 106; i.e., Bicknell discloses “a device-side IO device interconnect port.” Bicknell’s patent application, however, neither disclosed nor taught “at least one host-side IO device interconnect port provided in a said at least one IO device interconnect for coupling to said host entity, in which the at least one IO device interconnect controller is coupled to said CPC.”

In conclusion, applicant points out that Bicknell et al. neither disclose nor suggest at least

the following features of the present invention as claimed in claim 1:

- “an external storage virtualization controller (SVC)”
- “wherein said storage virtualization controller comprises: a central processing circuitry (CPC) for performing IO operations in response to said IO requests of said host entity”
- 5 _-“at least one host-side IO device interconnect port provided in a said at least one IO device interconnect for coupling to said host entity, in which the at least one IO device interconnect controller is coupled to said CPC.”

For at least these reasons, applicant asserts that currently amended claim 1 should be 10 found allowable with respect to the teachings of Bicknell et al. Because the amended claims 21, 78, and 90 of the instant application include the same or equivalent features, applicant asserts they too should be found allowable for at least the same reasons as those provided above for amended claim 1. Claims 2-8, 10-20; 22, 24-53; 79-89; and 91-95 are dependent upon base claims 1, 21, 78, and 90, respectively, and should therefore be allowable with 15 respect to the teachings of Bicknell et al. for at least the same reasons.

Concerning the patentability of the dependent claims, applicant has also provided further comments regarding the patentability of particular dependent claims with respect to the cited reference of Bicknell et al. in response to the Examiner’s comments of the Office action (OA) dated 12/27/2006 as follows:

20 Point 20 in the OA

As per dependent claims 4, 30, 87, and 93, the instant application claims wherein a said at least one PSD comprises a PATA PSD and a serial-to-parallel converter is provided between said device-side IO device interconnect controller and said PATA PSD; on the contrary, data interface 144 of fig. 6 and paragraph 0030 of Bicknell only discloses data 25 interface 144 of fig. 6 and serial or parallel ATA interfaces, but Bicknell fails to disclose to have both serial and parallel ATA PSDs, and a serial-to-parallel converter provided between said device-side IO device interconnect port and said PATA PSD.

In addition, applicant has corrected several occurrences of antecedent basis

problem involving “a”, “said”, “at least”, “a said” and “interconnect controller that are related to this issue in claims 4, 30, 87 and 93 and also throughout other claims of the instant application, in which “interconnect controller” in claims 4 and 30 are replaced by “interconnect port” because of antecedent basis. Corrections of this nature are made to claims 3, 4, 6, 7, 24, 26, 32, 33, 78, 86, 87, 90, 92, and 93, No new matter is entered.

5 Point 26 in the OA

As per dependent claims 10 and 24, the instant application discloses wherein said host-side IO device interconnect port and said device-side IO device interconnect port are provided in the same IO device interconnect controller; on the contrary, fig. 6 and paragraph 0026 of Bicknell only discloses data ports 204.11-204.14, **but Bicknell fails to disclose host-side IO device interconnect port, not to speak of the fact that said host-side IO device interconnect port and said device-side IO device interconnect port are provided in the same IO device interconnect controller.**

10 Point 27 in the OA

As per dependent claims 11 and 25, the instant application claims wherein said host-side IO device interconnect port and said device-side IO device interconnect port are provided in different IO device interconnect controllers; on the contrary, fig. 6 and paragraph 0026 of Bicknell only discloses data ports 204.11-204.14, **but Bicknell fails to disclose host-side IO device interconnect port, not to speak of the fact that said host-side IO device interconnect port and said device-side IO device interconnect port are provided in different IO device interconnect controllers.**

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Point 28 in the OA

As per dependent claims 12 and 27, the instant application claims wherein said storage virtualization controller comprises a plurality of host-side IO device interconnect

ports each for coupling to a host-side IO device interconnect; on the contrary, fig 6 and paragraph 26 of Bicknell only discloses that interface 200.1 of first connector 108.1 includes data ports 204.11-204.14, which respectively correspond to disc drives 106.1-106.4, **but Bicknell fails to discloses a plurality of host-side IO device interconnect ports each for coupling to a host-side IO device interconnect.**

5 Point 29 in the OA

As per dependent claims 13 and 29, the instant application claims wherein said storage virtualization controller (SVC) is configured to present redundantly a logical media unit on at least two of said plurality of host-side IO device interconnect ports, so that there are redundant paths between the SVC and the host, where if one of the redundant paths is open, then the other can still function; on the contrary, paragraph 0019 of Bicknell only discloses that disc drive also includes a data interface 144 including a connector 146 located at rear side 148, **but Bicknell fails to discloses that said storage virtualization controller is configured to present redundantly a logical media unit (LMU) on at least two of said plurality of host-side IO device interconnect ports.**

Point 30 in the OA

As per dependent claims 14 and 35, the instant application claims wherein at least 20 one said host-side IO device interconnect port in Fibre Channel supporting point-to-point connectivity in target mode; on the contrary, paragraph 0030 and fig. 6 of Bicknell only discloses all of the interfaces of the components of disc storage subsystem 100 are preferably standardized, such as serial or parallel ATA interfaces, having standardized connectors, such as fiber channel connectors, **but Bicknell fails to disclose at least one 25 said host-side IO device interconnect port in Fibre Channel supporting point-to-point connectivity in target mode.**

Point 31 in the OA

As per dependent claims 15 and 36, the instant application claims wherein at least one said host-side IO device interconnect port in Fibre Channel supporting private loop connectivity in target mode; on the contrary, paragraph 0030 and fig. 6 of Bicknell only discloses all of the interfaces of the components of disc storage subsystem 100 are 5 preferably standardized, such as serial or parallel ATA interfaces, having standardized connectors, such as fiber channel connectors, **but Bicknell fails to disclose at least one said host-side IO device interconnect port in Fibre Channel supporting private loop connectivity in target mode.**

10 Point 32 in the OA

As per dependent claims 16 and 37, the instant application claims wherein at least one said host-side IO device interconnect port in Fibre Channel supporting public loop connectivity in target mode; on the contrary, paragraph 0030 and fig. 6 of Bicknell only discloses all of the interfaces of the components of disc storage subsystem 100 are 15 preferably standardized, such as serial or parallel ATA interfaces, having standardized connectors, such as fiber channel connectors, **but Bicknell fails to disclose at least one said host-side IO device interconnect port in Fibre Channel supporting public loop connectivity in target mode.**

20 Point 34 in the OA

As per dependent claim 34, the instant application claims wherein said storage virtualization controller further comprises at least one multi-device device-side expansion port for accommodating an additional set of at least one PSD. (Please refer to fig. 17 and fig. 18 and paragraph 0094) In other words, through using expansion port, the PSDs can 25 be added as many as require; on the contrary, fig. 6 of Bicknell only discloses midplane card ports 209 of fig. 6, **but Bicknell fails to disclose at least one multiple-device device-side expansion port for accommodating an additional set of at least one PSD.**

Point 35 in the OA

As per dependent claim 42 and 80, the instant application claims comprising an enclosure management services (EMS) mechanism, wherein the EMS circuitry 360 is attached to the CPC240 for managing and monitoring at least one of the following devices belonging to the storage virtualization subsystem 20: power supplies, fans, temperature sensor, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms, PSD canister locks, door locks; on the contrary, MUX of fig. 8 and paragraph 0037 of Bicknell only discloses the multiplexing electronics selectively opens and closes the first and second data communication paths in response to at least one control signal, **but Bicknell fails to discloses that the EMS circuitry 360 is attached to the CPC240 for managing and monitoring at least one of the following devices belonging to the storage virtualization subsystem 20: power supplies, fans, temperature sensor, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms, PSD canister locks, door locks.**

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Point 36 in the OA

As per dependent claim 43, the instant application claims wherein said enclosure management services mechanism manages and monitors at least one of the following devices belonging to the storage virtualization subsystem: power supplies, fans, temperature, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms, PSD canister locks, door locks; on the contrary, paragraph 0031 of Bicknell **fails to disclose said enclosure management services mechanism manages and monitors at least one of the following devices belonging to the storage virtualization subsystem: power supplies, fans, temperature, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms, PSD canister locks, door locks.**

Point 37 in the OA

As per dependent claim 44, the instant application claims wherein said enclosure

management services mechanism is configured to support direct-connect EMS configuration; on the contrary, fig. 8 of Bicknell **fails to disclose that said enclosure management services mechanism is configured to support direct-connect EMS configuration.**

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Point 38 in the OA

As per dependent claim 45, the instant application discloses wherein said enclosure management services mechanism is configured to support device-forwarded EMS configuration; on the contrary, fig. 8 of Bicknell **fails to disclose that said enclosure management services mechanism is configured to support device-forwarded EMS configuration.**

Point 39 in the OA

As per dependent claims 46, 81, 82 and 83, the instant application claims wherein said enclosure management services mechanism is configured to support direct-connect EMS configuration and device-forwarded EMS configuration; on the contrary, fig. 8 and its description of Bicknell **fails to disclose that said enclosure management services mechanism is configured to support direct-connect EMS configuration and device-forwarded EMS configuration.**

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Point 40 in the OA

As per claim 50, the instant application claims wherein said enclosure management service further comprises status-monitoring circuitry to communicate with said storage virtualization controller; on the contrary, paragraph 0031 of Bicknell **fails to disclose that said enclosure management service further comprises status-monitoring circuitry to communicate with said storage virtualization controller.**

Point 41 in the OA

As per claims 88 and 94, the instant application claims wherein the step of performing said at least one IO operation comprises issuing at least one device-side IO request to said device-side IO device interconnect controller and reformatting said device-side IO request and accompanying IO data into at least one data packet for transmission; on the contrary, paragraph 0030 of Bicknell **fails to disclose that the step of performing said at least one IO operation comprises issuing at least one device-side IO request to said device-side IO device interconnect controller and reformatting said device-side IO request and accompanying IO data into at least one data packet for transmission.**

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Claims 1, 21, 78, and 90 are rejected under 35 USC 102e as being anticipated by Johnson et al. (US pub. 2003/0033477)

15 Applicant firstly notes that claims 1, 21, 78, and 90 are currently amended to include limitations equivalent to original claim 9 or original claim 23, both of which were not rejected as being anticipated by Johnson et al. because Johnson et al. does not disclose or suggest the features claimed in claims 9 and 23. For at least this reason, currently amended claims 1, 21, 78, and 90 should also be found allowable with respect to the cited reference of Johnson et al. Additional comments comparing specific differences of the present invention as claimed with respect to the teachings of Johnson et al. are provided in the following.

20 Currently amended independent claims 1, 21, 78 and 90 of the instant application claim an external storage virtualization controller, where the external storage virtualization controller is external and stand-alone, and thus, is coupled to the host entity through the host-side IO device interconnect port, and, is used to virtualize physical storage by combining sections of physical storage devices (PSDs) into logical storage entities, herein referred to as logical media units (LMUs), that are made accessible to a host system. **Please also refer to the above-described remarks concerning the 35 USC 102e rejection based on Bicknell et al.** On the contrary, controller 202 of fig. 2 and paragraph 0028 of Johnson fail to disclose “an external storage virtualization

controller.”

Additionally, currently amended independent claims 1, 21, 78 and 90 instant application claim at least one physical storage device (PSD), each coupled to the storage virtualization controller through a point-to-point serial-signal interconnect, for providing storage to the storage virtualization computer system through the storage virtualization controller; on the contrary, paragraphs 0022 and 0023 of Johnson only disclose that the present invention may be practiced with a variety of Message Passing technology (MPT) controller, **but Johnson fails to disclose where the MPT can be applied to, and detailed descriptions of the MPT.**

10 **Claims 1, 21, 78, and 90, are rejected under 35 USC 102e as being anticipated by Applicant’s Admitted Prior Art (AAPA)**

Applicant firstly notes that claims 1, 21, 78, and 90 are currently amended to include limitations equivalent to original claim 9 or original claim 23, both of which were not rejected as being anticipated by AAPA because the AAPA does not disclose or suggest the features claimed in claims 9 and 23. For at least this reason, currently amended claims 1, 21, 78, and 90 should also be found allowable with respect to the AAPA. Additional comments comparing specific differences of the present invention as claimed with respect to the AAPA are provided in the following.

Currently amended independent claims 1, 21, 78 and 90 disclose an external storage virtualization controller that connects to the host system via an IO interface, but the AAPA (see paragraph 0006 and fig. 6) **fails to disclose that the device-side IO interface is of a point-to-point serial-signal type.**

Currently amended independent claims 1, 21, 78 and 90 disclose at least one physical storage device (PSD), each coupled to the storage virtualization controller through a point-to-point serial-signal interconnect for providing storage to the storage virtualization computer system through the storage virtualization controller, but what paragraph 0008 of the AAPA discloses is that DADSs that implement point-to-point IO device interconnects to connect to the host system (e.g. Parallel ATA HDDs, Serial ATA

HDDs, etc) cannot be directly combined to from a “JBOD” system as defined above for they do not allow the connection of multiple devices directly to the IO device channel, which is a problem to be solve by the instant application.

Additionally, currently amended independent claims 1, 21, 78 and 90 further disclose 5 an external storage virtualization controller (SVC), which comprises “a central processing circuitry (CPC) for performing IO operation in response to said IO requests of said host entity; at least one IO device interconnect controller coupled to said CPC; at least one host-side IO device interconnect port provided in a said at least one IO device interconnect for coupling to said host entity; and at least one device-side IO device 10 interconnect port provided in a said at least one IO device interconnect for coupling to a said at least one PSD.” These features are not disclosed in the background section of the present application.

Claims 17, 19, 38, 40, 47, 48, 84, and 85 are rejected under 35 USC 103a as being 15 unpatentable over Bicknell et al. (US pub. 2003/0193776) in view of Rabinovitz et al. (US pat. 6,483,107)

As described above, claims 17, 19, 38, 40, 47, 48, 84, and 85 are dependent claims based on base claims believed allowable by the applicant with respect to the cited references for the reasons provided. Therefore, dependent claims 17, 19, 38, 40, 47, 48, 84, and 85 20 should also be found allowable for at least the same reasons. Additional comments comparing specific differences of the present invention as claimed with respect to the teachings of Bicknell et al. and Rabinovitz et al. are provided in the following.

As per dependent claims 17, 19, 38 and 40, the instant application claims the storage virtualization subsystem including at least one said host-side IO device interconnect port 25 is parallel SCSI operating in target mode; on the contrary, paragraph 0030 of Bicknell and col. 16, line 49 of Rabinovitz only disclose that all of the interfaces of the components of disc storage subsystem 100 are preferably standardized, such as serial or parallel ATA interface, and that the connections on the SCSI units are for eighty-pin SCA drives, but

there are boards which work for other interfaces, **but Rabinovitz fails to disclose that at least one said host-side IO device interconnect port is parallel SCSI operating in target mode.**

As per dependent claims 47 and 84, the instant application claims wherein said 5 enclosure management services mechanism (EMS) is configured to support SES enclosure management services protocol, where said enclosure management services mechanism manages and monitors at least one of the following devices belonging to the storage virtualization subsystem: power supplies, fans, temperature, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms, PSD canister locks, door 10 locks; on the contrary, fig. 8 and paragraph 0028 of Bicknell only discloses the MUX 208 that controls the opening and closing of data paths 212 and 213 in response to at least one control signal from controllers 108, **but fail to disclose managing and monitoring at least one of power supplies, fans, temperature, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms;** moreover, line 23 of col.17 of Rabinovitz 15 only discloses monitoring all of the peripheral enclosure using just one SAF-TE/SES, **but fails to disclose where SAF-TE/SES can be applied to, and fails to discloses detailed description of their applications.**

As per dependent claims 48 and 85, the instant application claims wherein said enclosure management services mechanism (EMS) is configured to support SAF-TE 20 enclosure management services protocol, where said enclosure management services mechanism manages and monitors at least one of the following devices belonging to the storage virtualization subsystem: power supplies, fans, temperature, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms, PSD canister locks, door locks; on the contrary, fig. 8 and paragraph 0028 of Bicknell only discloses the MUX 208 that controls the opening and closing of data paths 212 and 213 in response to at least one 25 control signal from controllers 108, but fail to disclose **managing and monitoring at least one of power supplies, fans, temperature, voltages, uninterruptible power supplies, batteries, LEDs, audible alarms;** moreover, line 23 of col.17 of Rabinovitz

only discloses monitoring all of the peripheral enclosure using just one SAF-TE/SES, **but fails to disclose where and how SAF-TE/SES can be applied to, and fails to disclose detailed description of their applications.**

5 **Claims 18, 39, 49, 51, and 53 are rejected under 35 USC 103a as being unpatentable over Bicknell et al (US pub. 2003/0193776) in view of Colton (US pub. 2005/0089027)**

As described above, claims 18, 39, 49, 51, and 53 are dependent claims based on base claims believed allowable by the applicant with respect to the cited references for the reasons provided. Therefore, dependent claims 18, 39, 49, 51, and 53 should also be found allowable 10 for at least the same reasons. Additional comments comparing specific differences of the present invention as claimed with respect to the teachings of Bicknell et al. and Colton are provided in the following.

As per dependent claims 18 and 39, the instant application claims wherein at least one said host-side IO device interconnect port is Ethernet supporting the iSCSI protocol 15 operating in target mode; on the contrary, fig. 6 of Bicknell fails to disclose host-side IO device interconnect port, and fig. 11 and paragraph 1487 of Colton only discloses 2 high-speed SCSI disk drives to ensure adequate performance, but fails to discloses iSCSI protocol operating in target mode. In addition, it should be reminded that the Colton relates to optical transport system and Dense Wave Division Multiplexing(DWDN); on 20 the contrary, the instant application relates to storage virtualization system, **both of which are in different fields of invention.**

As per dependent claims 49, 51 and 53, the instant application claims wherein said EMS mechanism further comprises I2C latches to communicate with said storage virtualization controller; on the contrary, fig.8 of Bicknell fails to disclose such an EMS, 25 and fig. 11 of Colton indeed discloses I2C latches, but it should be reminded that the Colton relates to optical transport system and Dense Wave Division Multiplexing(DWDN); on the contrary, the instant application relates to storage virtualization system, **both of which are in different fields of invention.**

As per dependent claim 52, the instant application claims wherein said EMS mechanism further comprises a CPU for running a program; on the contrary, Bicknell only disclose a micro-computer, but fails to disclose the EMS mechanism, and fig. 11 and paragraph 0810 of Colton only discloses including all of the CPU function needed to 5 operate and maintain the IOS (intelligent optical switch) from a node perspective, but Colton fails to disclose a CPU for running a program. Moreover, it should be reminded that the Colton relates to optical transport system and Dense Wave Division Multiplexing (DWDM); on the contrary, the instant application relates to storage virtualization system, **both of which are in different fields of invention.**

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Claims 89 and 95 are rejected under 35 USC 103a as being unpatentable over Bicknell et al. (US pub. 2003/0193776) in view of Johnson et al. (US pub. 2003/0033477).

As described above, claims 89 and 95 are dependent claims based on base claims believed allowable by the applicant with respect to the cited references for the reasons 15 provided. Therefore, dependent claims 89 and 95 should also be found allowable for at least the same reasons. Additional comments comparing specific differences of the present invention as claimed with respect to the teachings of Bicknell et al. and Johnson et al. are provided in the following.

As per dependent claims 89 and 95, the instant application claims wherein said data 20 packet comprises a start segment at the beginning indicating the start of said data packet, an end segment at the end indicating the end of the data packet, a payload data segment containing actual IO information to transmit through the device-side IO device interconnect, and a check data segment containing check codes derived from said payload data for check the correctness of said payload data after transmission; on the contrary, 25 paragraph 25 of Johnson only discloses Initial Stripe Size for indicating the size (i.e., the number of bytes) of the initial block of data (e.g., metadata or header information) to be transferred for the first stripe of the drive, an Initial Skip Size for indicating an amount of the drive(i.e., the number of bytes) to skip prior to transferring data for the drive, a Stripe

size for indicating the size 9 (i.e., the number of bytes) in a single stripe, and only discloses that each SGL entry contains an address and a length and may contains, but **fails to disclose the start segment, end segment, payload data segment, and check data segment.**

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New Claim

New claim 96 is added being dependent upon base claim 21. No new matter is added. In particular, claim 96 is illustrated in Fig.18 and described in paragraph [0092] stating, “However, if the storage units to which the expansion ports are connected are dual-ported, then a SVC equipped with one or more pairs of redundantly-configured expansion ports could have one of the ports in a redundant pair connected to one of the ports in the dual-ported pair in a storage unit and the other port in the redundant pair connected to the other port in the storage unit’s dual-ported pair. Fig.18 depicts such a configuration.”

Concerning the patentability of newly added claim 96, applicant points out that none of the cited references teach or suggest that the storage virtualization controller further comprises a plurality of redundantly-configured device-side expansion ports, as is claimed in new claim 96.

For at least these reasons, applicant asserts new claim 96 should be found allowable with respect to the cited references. Consideration of newly added claim 96 is respectfully requested.

Conclusion:

Thus, all pending claims are submitted to be in condition for allowance with respect to the cited art for at least the reasons presented above. The Examiner is encouraged to telephone the undersigned if there are informalities that can be resolved in a phone conversation, or if the Examiner has any ideas or suggestions for further advancing the prosecution of this case.

Appl. No. 10/707,871
Amdt. dated April 27, 2007
Reply to Office action of December 27, 2006

Sincerely yours,

Winston Hsu

Date: 04/27/2007

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10 Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.)